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ABSTRACT

Naturalization and Immigrants' Health*

The "healthy immigrant effect" refers to the well-documented fact that immigrants are healthier than natives upon arrival, but their health level converges to that of natives over time. Unfortunately, little is known about whether environmental, institutional, or selective return migration mechanisms are behind the convergence. In this paper, I test whether immigrants' naturalization influences health convergence speed. Using restricted-access Spanish health data from the National and European Health Surveys, I estimate the impact of naturalization on health by exploiting that naturalization is possible after two years of residence for Latinoamerican immigrants and after ten years for all other immigrants. I find that naturalization worsens immigrants' health and thus accelerates the speed of convergence to natives' health. In particular, naturalization increases the propensity to suffer from varicose veins, cervical problems, lower back pain, constipation, depression, and anxiety. Changes in dietary habits and increases in employment are potential mechanisms behind these effects.

JEL Classification: J15, J61, I14

Keywords: naturalization, immigrants' health, healthy immigrant effect

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1 Introduction

Most of the previous literature finds a "healthy immigrant effect" (HIE), meaning that immigrants have better health than comparable natives when they arrive in the host country and during their first years since migration. However, their health deteriorates with additional years of residence in the host country and approaches that of natives. The positive difference in health between recently arrived immigrants and natives is attributed to the positive health self-selection of migrants. It is also due to the additional hurdles they must overcome during their migration journey and to the health screening or positive selection that the host countries apply to prospective immigrants. However, little is known about the factors behind convergence in health over time. Naturalization is a crucial factor favoring immigrants' economic and social integration Saurer [2017]. Does it also foster convergence in health? I study whether becoming a citizen of the hosting country affects immigrants' physical and mental health, thus affecting the speed of convergence of immigrants' to natives' health.

I first document the healthy immigrant effect in the Spanish context by comparing the health of immigrants and natives and studying how this comparison changes with years since migration. I then study the impact of gaining Spanish citizenship on immigrants' health. The Spanish case is particularly interesting because Spanish authorities make it easier for immigrants from former Spanish colonies or countries with a special relationship with Spain to gain Spanish citizenship. In particular, immigrants from these "special status" countries can apply for Spanish citizenship after two years of residence in Spain while all other immigrants can apply for Spanish citizenship only after ten years of residence.[1] This difference in naturalization rules across countries of origin provides an opportunity to estimate the change in health as a consequence of becoming Spanish citizens as immigrants from non-special-status countries who have resided in Spain for less than ten years act as the control group. As the naturalization process lasts two years, I use the four years since migration cutoff as an exogenous shifter of the probability of

[1] In all cases, immigrants can apply for citizenship after one year if they marry a Spanish citizen.

becoming a Spanish citizen. I run IV regressions where I instrument having Spanish citizenship by the interaction of residing in Spain for more than four years and coming from a special-status country in a sample of immigrants who have been in Spain for less than ten years.

I use restricted-access data from the Spanish National Health Survey and the European Health Survey for 2011, 2014, 2017, and 2020. This dataset contains information on country of birth, nationality, years of residence in Spain, and various health measures.[2]

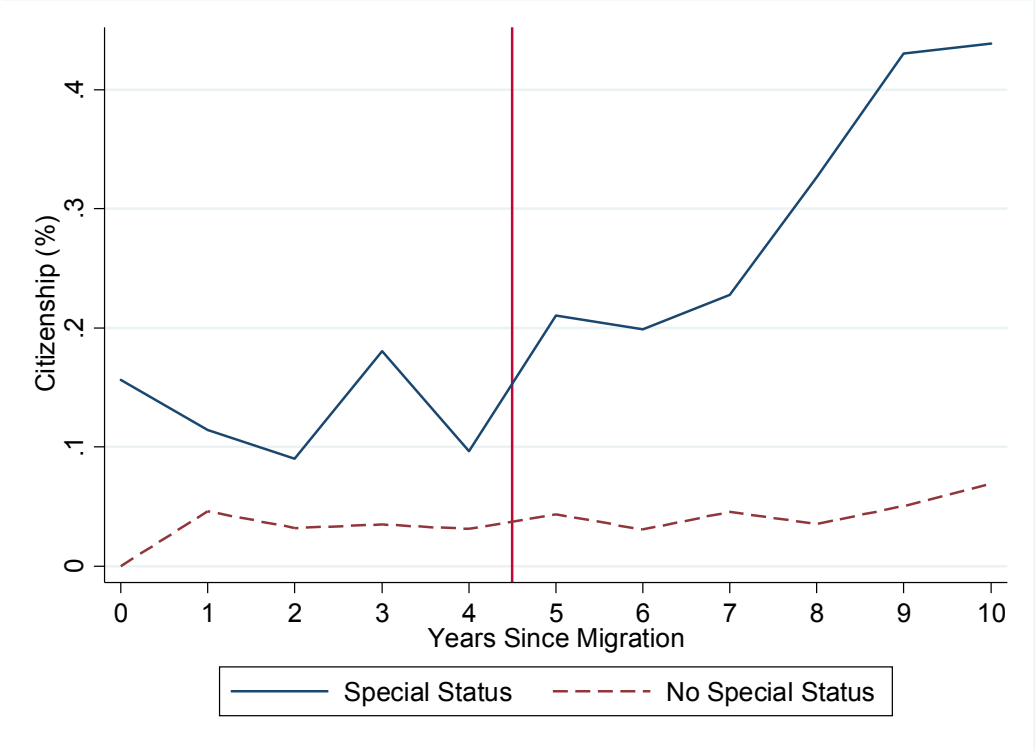
Figure 1 illustrates the jump in the probability of gaining citizenship after four years of residence for immigrants from special-status countries. While the proportion of immigrants from non-special-status countries who have citizenship remains stable, those from special-status countries are stable at a higher level up to the fourth year since migration (probably because more immigrants from special-status countries already have Spanish citizenship upon arrival) and increases significantly after that.

Figure 2 shows the evolution of a one-to-five health index over the years since migration separately for immigrants from special status and non-special-status countries. Consistently with the healthy immigrant hypothesis, immigrants' health levels deteriorate over time for the two sets of immigrants. Although average health levels are comparable for immigrants who have resided less than four years in Spain, the health of immigrants from special-status countries remains consistently lower than that of other immigrants after four years of residence. This different evolution illustrates my main result that naturalization worsens immigrants' health.

I find evidence in favor of the healthy immigrant effect. The average immigrant with less than five years of residence has a health index 0.078 points higher than natives. In-

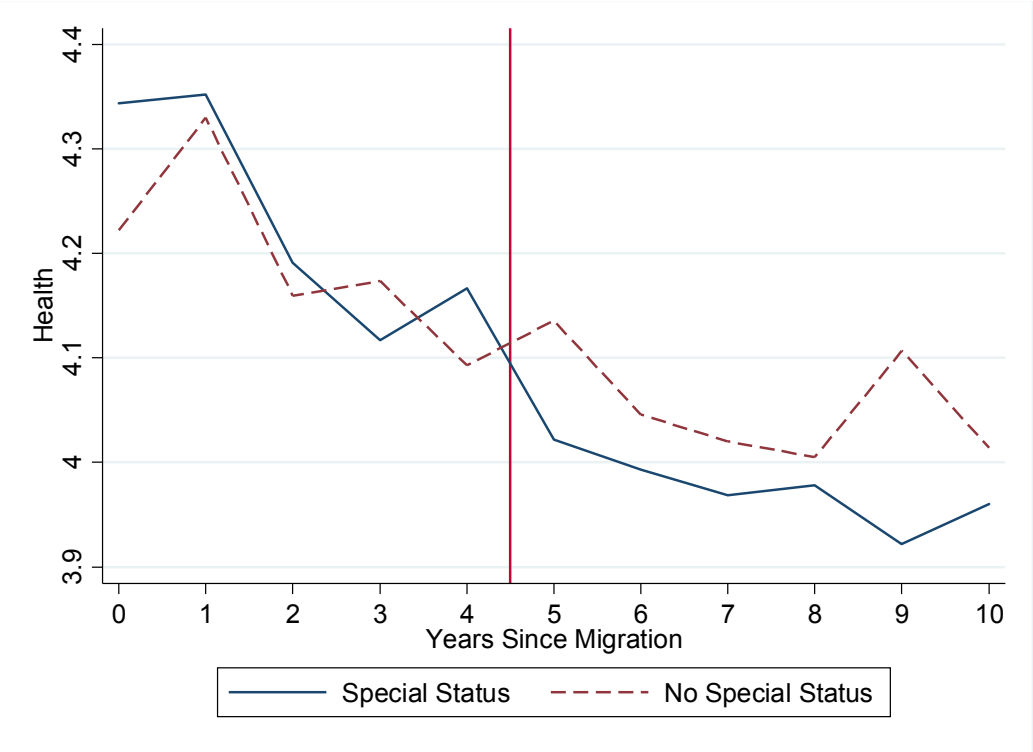
[2]The publicly available version of the Spanish National Health Survey is downloadable from the Ministry of Health website at https://www.mscbs.gob.es. Additionally, I obtained information on the country of birth, which is only available for research purposes. The data from the European Health Survey is publicly available on the National Statistics Institute webpage: https://www.ine.es. Data on the country of birth can be obtained for a fee by signing a confidentiality agreement.

Figure 1: Citizenship and Years Since Migration by Country of Origin's Status



Notes: Data is from the Spanish National Health Survey (2011 and 2017) and the European Health Survey (2014 and 2020). The sample includes all individuals born outside of Spain. Citizenship is the proportion of foreign-born individuals with Spanish citizenship.

Figure 2: Health and Years Since Migration by Country of Origin's Status



Notes: Data is from the Spanish National Health Survey (2011 and 2017) and the European Health Survey (2014 and 2020). The sample includes all individuals born outside of Spain. Health is a one-to-five index indicating whether the individual declares to be in very bad, bad, regular, good, or very good health.

stead, immigrants with more than five years of residence have a health index that is 0.031-0.077 points lower. The health of immigrants from special-status countries is worse than that of non-special-status countries, regardless of the years since migration.

In the sample of immigrants who arrived less than ten years ago, I find that naturalized immigrants have a 0.067 points higher health index when I control for individual characteristics like male, age, married, years of residence in Spain, country of origin, and region of residence. However, when instrumenting immigrants' naturalization by the interaction of being born in a special-status country and residing in Spain for four years or more, I find that having Spanish nationality reduces immigrants' health by 0.905 points (1.08 standard deviations). OLS estimates show no difference in mental health between naturalized and non-naturalized immigrants. However, IV estimates show that naturalization increases the probability of having mental health problems by 0.218. Hence, I conclude that the positive association between naturalization and health is fully explained by the selection of immigrants such that those obtaining Spanish nationality have better health than non-naturalized ones. However, when using comparable immigrants, I estimate a negative effect of naturalization on overall and mental health.

1.1 Related Literature

Several articles have documented the healthy immigrant effect. For the US see Anderson, Bulatao, Cohen, on Race, Council, et al. [2004], Abraido-Lanza, Dohrenwend, Ng-Mak, and Turner [1999], Antecol and Bedard [2006], and Giuntella [2013]. Chen, Ng, Wilkins, et al. [1996], Deri [2003], McDonald [2003] and Laroche [2000] have documented a health advantage among immigrants to Canada, while Donovan, d'Espaignet, Merton, and Van Ommeren [1992], Chiswick, Lee, and Miller [2008], and Powles, Hage, and Cosgrove [1990] do so for immigrants to Australia. Finally, Farré [2016] provides evidence that the healthy immigrant effect is also present in Spain. In all these setups, immigrants are positively selected with respect to natives and individuals who stayed in their coun-

try of origin. Positive selection of naturalized immigrants in the form of return migration could be behind these results. An additional explanation of the healthy immigrant effect is that immigrants have healthier habits in their country of origin, which disappear as they integrate into the host society. The latter explanation is consistent with my findings if immigrants adopt the habits of the host society faster after naturalization.

Several previous studies have looked at the value of migrants' legal status on both their own and their children's welfare, focusing on both regularizations of residence status, changes in access to citizenship and the EU enlargements. All these changes are found to have beneficial effects on a range of different outcomes: labor market outcomes (Gathmann and Keller [2018]), birth weight (Salmasi and Pieroni [2015]), consumption (Dustmann, Fasani, and Speciale [2017]), crime (Pinotti [2017]) and immigrant children's educational attainment (Felfe, Rainer, and Saurer [2020]). To the best of my knowledge, this paper is the first to study whether naturalization affects immigrants' health.

2 Data and Institutional Framework

In this study, I combine data from the 2011 and 2017 waves of the Spanish National Health Survey (SNHS) and the 2014 and 2020 waves of the European Health Survey (EHS). Both surveys consist of four modules on health status, health care use, health determinants, and socioeconomic background variables. Although the two surveys are not identical, they share a set of harmonized variables. They target the population aged at least 15 and living in private households. Their frequency is every six years, alternating each other every three years. The two surveys are representative of the Spanish population.

The SNHS and EHS include a wide variety of information about Spanish residents' health and socioeconomic conditions, and it contains individualized samples for adults and children. For this work, I restrict my attention to the adult samples starting in 2011. I do not consider previous editions of these surveys because they did not ask for infor-

mation on the respondent's nationality or country of birth or the number of years of residence in Spain, critical variables of my analysis. I had access to the latter information for the years in which it existed by signing a confidentiality agreement.

Table 1 describes the main variables for the sample of natives and immigrants used to document the healthy immigrant effect. The average level of health is slightly below "good health". Natives' average health index is 0.2 points lower than immigrants'. Immigrants from special status and non-special-status countries have very similar levels of health on average. Non-naturalized immigrants are slightly healthier than naturalized ones. One out of four individuals in the sample declares to have any mental health problem (depression or anxiety). The incidence of mental health problems is much higher among natives than immigrants (8.7 percentage points higher), immigrants from special-status countries as compared to those from non-special-status countries (5 percentage points higher), and naturalized immigrants (10 percentage points higher than non-naturalized ones). Nine percent of my sample is foreign-born. Almost 34% of immigrants obtain Spanish nationality. The proportion is 2.5 times higher for immigrants from special-status countries. Immigrants from a special-status country represent four percent of the total sample and 46 percent of the immigrant sample. Two-thirds of immigrants with Spanish citizenship are from special-status countries, while this proportion decreases to 35% for non-naturalized immigrants. The average immigrant has been in Spain for slightly more than 15 years. The average immigrant from a non-special-status country has been in Spain for two years more than the average special-status immigrant. The average naturalized immigrant has been in Spain for 22 years, while the average number of years in Spain is 12 for non-naturalized immigrants. Less than half of the sample is male. The group of immigrants from non-special-status countries has the highest proportion of males (49%), followed by non-naturalized and natives (47%), naturalized (40%), and immigrants from special-status countries (39%). The average individual in our sample is 53 years old. The eldest subsample is formed by natives (54 years old on average). Immigrants from special status and non-special-status countries have similar ages on average (43 and 42, respectively), while naturalized immigrants are almost five

years older than non-naturalized ones. Finally, slightly more than half of the sample is married: 60% of non-special-status immigrants, 56% of non-naturalized, 53% of natives, 52% of naturalized, and 48% of special-status immigrants are married.

Table 1: Descriptive Statistics. Natives and Immigrants sample

Variable	All	Native	Immigrant	Special Status	No Special Status	Citizenship	No Citizenship
overall health	3.755	3.736	3.949	3.922	3.972	3.861	3.99
	(0.915)	(0.92)	(0.835)	(0.835)	(0.833)	(0.871)	(0.813)
mental health	0.256	0.264	0.177	0.203	0.153	0.24	0.145
	(0.437)	(0.441)	(0.381)	(0.402)	(0.36)	(0.427)	(0.352)
immigrant	0.09	0	1	1	1	1	1
	(0.286)	(0)	(0)	(0)	(0)	(0)	(0)
citizenship	0.940	0.999	0.336	0.493	0.202	1	0
	(0.238)	(0.024)	(0.472)	(0.5)	(0.401)	(0)	(0)
special-status country	0.042	0	0.461	1	0	0.677	0.352
	(0.2)	(0)	(0.499)	(0)	(0)	(0.468)	(0.478)
years since migration			15.359	14.19	16.36	21.951	12.019
			(13.503)	(11.592)	(14.875)	(15.509)	(10.941)
male	0.463	0.465	0.443	0.387	0.491	0.396	0.466
	(0.499)	(0.499)	(0.497)	(0.487)	(0.5)	(0.489)	(0.499)
age	52.998	54.069	42.186	41.525	42.752	45.12	40. 699
	(18.98)	(19.025)	(14.64)	(14.26)	(14.936)	(15.251)	(14.09)
married	0.53	0.528	0.543	0.48	0.596	0.519	0.555
	(0.499)	(0.499)	(0.498)	(0.5)	(0.491)	(0.5)	(0.497)
N. Observations	88,863	80,855	8,008	3,695	4,313	2,693	5,315

Notes: Data is from the Spanish National Health Survey (2011 and 2017) and the European Health Survey (2014 and 2020). Overall health is a one-to-five index indicating whether the individual declares to be in very bad, bad, regular, good, or very good health. Mental is an indicator equal to one if the individual declares to suffer depression or anxiety.

Table 2 describes the sample included in the estimation of the effect of naturalization on health, composed of immigrants with less than ten years of residence in Spain. The average level of health is very similar for all types of immigrants and slightly above the "good health" level. Ten percent of immigrants declare to have mental health problems. Immigrants from special status countries are almost seven percentage points more likely to have mental problems. Moreover, naturalized immigrants are two percentage points more likely to have mental health problems. Slightly less than 13% of immigrants have Spanish citizenship (23% for special-status countries and 4% for non-special-status countries). Almost half of the sample comes from a special-status country. The proportion reaches 84% for Spanish citizens and 42% for non-Spanish citizens. The average immigrant with less than ten years of residence in Spain has been in Spain for slightly less than five years and a half. The average naturalized immigrant has been in Spain one year more than the average non-naturalized immigrant, while the average number of years since

migration is the same for immigrants from special status and non-special-status countries. Slightly less than 42% of immigrants are males. Males represent a higher share of non-naturalized immigrants (more than three percentage points higher) and non-special-status immigrants (11 percentage points more than special-status immigrants). All types of immigrants are around 36 years old. One in two individuals is married in the subsamples of Spanish and non-Spanish citizens. However, immigrants from non-special-status countries are 15 percentage points more likely to be married.

Table 2: Descriptive Statistics: Only Immigrants sample

Variable	All	Special Status	No Special Status	No Citizenship	Citizenship
overall health	4.082	4.061	4.101	4.081	4.088
	(0.763)	(0.776)	(0.752)	(0.757)	(0.804)
mental health	0.103	0.137	0.07	0.1	0.122
	(0.303)	(0.344)	(0.256)	(0.3)	(0.328)
citizenship	0.129	0.229	0.039	0	1
	(0.336)	(0.42)	(0.193)	(0)	(0)
special-status country	0.478	1	0	0.423	0.844
	(0.5)	(0)	(0)	(0.494)	(0.363)
years since migration	5.459	5.435	5.48	5.318	6.403
	(2.58)	(2.664)	(2.503)	(2.563)	(2.498)
male	0.417	0.357	0.471	0.421	0.388
	(0.493)	(0.479)	(0.499)	(0.494)	(0.488)
age	36.159	35.393	36.855	36.246	35.576
	(13.043)	(12.697)	(13.317)	(12.852)	(14.264)
married	0.518	0.441	0.588	0.521	0.497
	(0.5)	(0.497)	(0.492)	(0.5)	(0.501)
N. Observations	2,628	1,255	1,373	2,288	340

Notes: Data is from the Spanish National Health Survey (2011 and 2017) and the European Health Survey (2014 and 2020). Health is a one-to-five index indicating whether the individual declares to be in very bad, bad, regular, good, or very good health. Mental is an indicator equal to one if the individual declares to suffer depression or anxiety. The sample is composed of foreign-born individuals.

3 Methodology

I first estimate the healthy immigrant effect in my sample of all natives and immigrants included in the 2011, 2014, 2017, and 2020 waves of SHS and EHS. To this, I regress health on the interactions of a dummy for immigrant and years since migration measured in five-year intervals and a set of controls as follows:

$$Health_{i,t} = \beta_0 + \beta_1 Imm_{i,t} YSM < 5_{i,t} + \beta_2 Imm_{i,t} YSM5to10_{i,t} + \beta_3 Imm_{i,t} YSM10to15_{i,t} + \\ + \beta_4 Imm_{i,t} YSM > 15_{i,t} + \beta 5 Controls_{i,t} + \beta 6 Country_{i,t} + \beta 7 Wave_t + u_{i,t} \quad (1)$$

where *Health* is one of the health outcomes we study for immigrant i surveyed at time t, *Imm* is a dummy equal to one if the individual was born abroad. $YSM < 5$, $YSM5to10$, $YSM10to15$, and $YSM > 15$ are binary indicators for less than five, five to ten, ten to fifteen, and more than fifteen years since migration, respectively. *Controls* is a vector of individual characteristics, *Country* denotes a vector of dummies for country of birth, *Wave* stands for a vector of year of the survey fixed effects, and u is the error term. Estimates are consistent with the healthy immigrant effect if $\beta_1 > \beta_2 > \beta_3 > \beta_4$.

I then study the impact of gaining Spanish citizenship on physical and mental health in a sample of individuals born outside Spain and residing in Spain. I estimate a regression of health on a dummy for being a Spanish citizen and several controls. The resulting equation is as follows:

$$Health_{i,t} = \gamma_0 + \gamma_1 Citizenship_{i,t} + \gamma_2 Controls_{i,t} + \gamma_3 Country_{i,t} + \gamma_4 Wave_t + v_{i,t} \quad (2)$$

where *Citizenship* is a dummy equal to one if the immigrant gained Spanish citizenship, and v is the error term.

I cannot interpret the coefficient γ_1 as a causal effect in the context of Equation 2. First, healthier individuals may be better equipped to prepare the paperwork required to gain citizenship. Second, unobserved individual characteristics like satisfaction with life in the host country can affect health and the probability of acquiring citizenship simultaneously. For this reason, I estimate Equation 2 using an instrumental variable approach based on eligibility rules for citizenship. I instrument *Citizenship* by the interaction of a dummy

equal to one if the individual lives in Spain for longer than four years and an indicator for coming from a special-status country. As immigrants' health may change with years of residence in the host country, I include years of residence dummies in my regression. In practice, I perform estimation in two steps. In the first step, I estimate citizenship as a function of the citizenship eligibility dummy, years of residence fixed effects, country fixed effects, and individual controls:

$$\begin{aligned} Citizenship_{i,t} = \alpha_0 + \alpha_1 YSM > 4 * SSC_{i,t} + \alpha_2 D(YSM)_{i,t} + \alpha_3 Controls_{i,t} + \\ + \gamma_4 Country_{i,t} + \gamma_5 Wave_t + w_{i,t} \end{aligned} \tag{3}$$

where SSC is a binary indicator for special-status country and $D(YSM)$ are years since migration fixed effects. In the second step, I use the predicted values of $Citizenship$ calculated from Equation 3 to estimate Equation 2. In this new estimation, I interpret γ_1 as the causal effect of citizenship on health.

4 Results

I first test whether the healthy immigrant effect is present in my data. Table 3 shows the result of estimating the evolution of the immigrant-native health gap over years since migration as in Equation 1. In the first three columns, the outcome of interest is overall health, while in the last three columns, the outcome is mental problems. Columns 1 and 4 do not distinguish immigrants by years since arrival and show that natives are healthier than immigrants on average. Columns 2 and 5 test the healthy immigrant effect for all immigrants, independently of their country of birth. The estimated coefficients corroborate that immigrants are healthier upon arrival. However, their health worsens as their time of residence increases, reaching health levels below those of natives for overall health and achieving full convergence with natives in mental health. Immigrants declare an average health index 0.08 point higher than natives' during their first five years of residence. Their

level of health worsens after the first five years of residence and becomes worse than natives' by a magnitude between -0.03 and -0.08. Immigrants are 0.06 percentage points less likely than natives to suffer from depression or anxiety during the first five years of residence. This difference diminishes to -0.034, -0.02, and zero for immigrants with 5 to 10, 10 to 15, and more than 15 years of residence, respectively.

Finally, columns 3 and 6 study the healthy immigrant effect separately for immigrants from special status and non-special-status countries. The healthy immigrant effect is present in both subsamples. For overall health, the coefficients of non-special-status immigrants are higher than those of special-status immigrants. This difference indicates that non-special-status immigrants present a higher advantage upon arrival, and their health is better than the other demographic groups, even if decreasing over years since migration. The same pattern holds for mental health problems: mental health of special status and non-special-status immigrants is better than that of natives, although it converges over time. Non-special-status immigrants have better mental health than special-status immigrants for all years since migration.

Table 4 contains the results of estimating equation 2 by OLS (first two columns) and IV (last two columns). I also check the validity of the IV in the first-stage regressions (columns 3 and 4). The OLS regressions show that naturalized immigrants have better health, conditional on gender, age, marital status, region of residence, year, years since migration, and country of birth. The conditional difference in the health index between naturalized and non-naturalized immigrants is 0.07. Naturalized immigrants are also less likely to have mental health problems by -0.03, but this difference is not statistically significant. The F-statistic of the excluded instrument is 33.6 for overall health and 16.9 for mental health. My causal estimates reveal that gaining Spanish nationality decreases health by -0.9 (almost 1.2 standard deviations) and increases the probability of depression and anxiety by 0.2 percentage points (two-thirds of a standard deviation).

I explore which health conditions drive the effects of naturalization on overall health and mental conditions in Table 5. The displayed coefficients result from estimating Equa-

Table 3: The Healthy Immigrant Effect

	Overall health			Mental problems		
	(1)	(2)	(3)	(4)	(5)	(6)
immigrant	-.135 (0.025)***			0.038 (0.013)***		
immi*YSM<5		0.078 (0.028)***			-.061 (0.014)***	
immi*YSM 5-10		-.051 (0.02)**			-.034 (0.01)***	
immi*YSM 10-15		-.077 (0.018)***			-.020 (0.009)**	
immi*YSM>15		-.031 (0.015)**			-.007 (0.008)	
NSS*YSM<5			0.085 (0.039)**			-.073 (0.02)***
NSS*YSM 5-10			-.013 (0.028)			-.059 (0.014)***
NSS*YSM 10-15			-.056 (0.024)**			-.025 (0.013)**
NSS*YSM>15			0.001 (0.02)			-.004 (0.011)
SS*YSM<5			0.07 (0.039)*			-.048 (0.02)**
SS*YSM 5-10			-.094 (0.029)***			-.006 (0.015)
SS*YSM 10-15			-.101 (0.025)***			-.015 (0.013)
SS*YSM>15			-.071 (0.023)***			-.011 (0.012)
Obs.	88863	88863	88863	50393	50393	50393
R^2	0.19	0.188	0.188	0.459	0.457	0.457
F statistic	99.143	177.157	171.363	206.375	368.344	356.064

Notes: Data is from the Spanish National Health Survey (2011 and 2017) and the European Health Survey (2014 and 2020). Health is a one-to-five index indicating whether the individual declares to be in very bad, bad, regular, good, or very good health. Mental is an indicator equal to one if individuals declare to suffer depression or anxiety. Regressions include dummies for gender, age, marital status, region of residence, and year. Columns 1 and 4 also include years since migration fixed effects. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: The Impact of Naturalization on Immigrants' Health

	OLS		FS		IV	
	health	mental problems	health	mental problems	health	mental problems
	(1)	(2)	(3)	(4)	(5)	(6)
citizenship	0.067 (0.039)*	-.030 (0.023)	0.167 (0.029)***	0.149 (0.036)***	-.905 (0.357)**	0.218 (0.12)*
Obs.	2628	1541	2628	1541	2543	1474
R^2	0.143	0.112	0.117	0.154	0.00002	0.018

Notes: Data is from the Spanish National Health Survey (2011 and 2017) and the European Health Survey (2014 and 2020). Health is a one-to-five index indicating whether the individual declares to be in very bad, bad, regular, good, or very good health. Regressions include dummies for gender, age, marital status, region of residence, and year. They also include years since migration and country fixed effects. *** p<0.01, ** p<0.05, * p<0.1.

tion 2 by instrumental variables. The outcomes are dummies for whether the respondent suffered from a specific health condition in the last year. I find significant positive effects for varicose veins, cervical problems, lower back pain, constipation, depression, and anxiety. I also find that naturalization increases the probability of employment which in turn increases the probability of work-related injuries, including cervical problems, lower back pain, and stress leading to stomach problems, depression, and anxiety (although the positive coefficient for accidents is imprecise). Romano and Wolf's estimates for multiple hypothesis testing confirm the significance levels in the table.

Table 5: The Impact of Naturalization on Health Conditions

Panel A

	hypertension	heart attack	heart problems	varicose veins	osteoarthritis	cervical	lower back	allergy
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
citizenship	-.026	0.008	-.003	0.262	0.05	0.174	0.218	0.174
	(0.046)	(0.01)	(0.024)	(0.083)***	(0.066)	(0.08)**	(0.084)***	(0.111)
Obs.	2628	2628	2628	2628	2628	2628	2628	2628
R^2	0.168	0.164	0.125	0.026	0.164	0.032	0.029	0.026

Panel B

	asthma	bronchitis	diabetes	sore	incontinence	cholesterol	cataracts	skin
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
citizenship	0.031	0.011	-.024	0.035	0.029	-.064	0.019	0.006
	(0.037)	(0.021)	(0.027)	(0.033)	(0.021)	(0.061)	(0.023)	(0.04)
Obs.	2628	2628	2628	2628	2628	2628	2628	2628
R^2	0.045	0.092	0.099	0.045	0.139	0.111	0.116	0.044

Panel C

	constipation	cirrhosis	depression	anxiety	mental	embolism	migraine	hemorrhoids
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
citizenship	0.15	0.007	0.087	0.136	-.011	0.006	0.114	-.0005
	(0.038)***	(0.017)	(0.043)**	(0.049)***	(0.013)	(0.004)	(0.074)	(0.027)
Obs.	2628	2628	2628	2628	2628	2628	2628	2628
R^2	0.045	0.045	0.042	0.014	0.298	0.447	0.03	0.058

Panel D

	tumor	osteoporosis	thyroid	prostate	menopause	accident	employed
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
citizenship	0.022	0.021	0.014	0.015	0.003	0.049	0.435
	(0.017)	(0.019)	(0.038)	(0.011)	(0.028)	(0.03)	(0.182)**
Obs.	2628	2628	2628	2628	2628	2628	2613
R^2	0.147	0.235	0.055	0.22	0.082	0.012	0.137

Notes: Data is from the Spanish National Health Survey (2011 and 2017) and the European Health Survey (2014 and 2020). The outcomes equal one if the individual declares to have suffered from that health condition in the last 12 months. Regressions include dummies for gender, age, marital status, region of residence, and year. They also include years since migration and country fixed effects. *** p<0.01, ** p<0.05, * p<0.1.

Changes in dietary habits are one of the potential mechanisms behind the healthy immigrant effect. I explore whether changes in the frequency of consumption of certain

types of food can explain my results. Frequency is a discrete variable equal to one if the individual never consumes that food item, two for less than once a week, three for once or twice per week, four for at least three times a week, and five for daily. Table 6 shows only the types of food for which coefficients are estimated precisely. The decrease in the consumption of fruit and cereals and the increase in the frequency of eating sausages can be behind the reduction in health due to naturalization.

Table 6: The Impact of Naturalization on Frequency of Food Consumption

	fruit	cereals	sausages	sweets
	(1)	(2)	(3)	(4)
citizenship	-1.425	-.838	1.888	-.997
	(0.447)***	(0.307)***	(0.938)**	(0.497)**
Obs.	1464	1463	1459	1463
R^2	0.028	0.028	0.09	0.09

Notes: The following food types did not provide significant estimates: meat, eggs, fish, carbohydrates, vegetables, legumes, dairy, soft drinks, fast food, chips, and juice. Data is from the Spanish National Health Survey (2011 and 2017) and the European Health Survey (2014 and 2020). The outcomes are equal to one if the individual never consumes that food item, two for less than once a week, three for once or twice per week, four for at least three times a week, and five for daily. Regressions include dummies for gender, age, marital status, region of residence, and year. They also include years since migration and country fixed effects. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Another potential mechanism behind my main effects is a reduction in medical care search after naturalization. For instance, a reduction in health care may happen if individuals' opportunity cost of time increases when they start working. We explore this possibility by estimating the impact of naturalization on time since the last visit to the doctor, a dummy for having been to the doctor in the last year, and the number of visits to the general practitioner and the specialist in the last year. The variable time since the last visit equals one if the individual did not go to the doctor, two for more than a year ago, three for more than a month and less than one year ago, and four for less than a month ago. Table 7 shows that naturalization may cause the time since the last visit to the doctor to increase and the number of visits to the general practitioner to decrease, but the coefficients are not precisely estimated.

Another potential mechanism behind the estimated effect of naturalization on health is the selection of immigrants. Naturalization may change the composition of the pool of immigrants so that those staying in the country are less healthy. To address this possi-

Table 7: The Impact of Naturalization on Doctor Visits

	time since last visit	last visit <1 year ago	number visits GP	number visits specialist
	(1)	(2)	(3)	(4)
citizenship	0.319	-.023	-.084	0.249
	(0.42)	(0.192)	(0.307)	(0.421)
Obs.	2543	2543	1391	395
R^2	0.074	0.084	0.078	0.186

Notes: Data is from the Spanish National Health Survey (2011 and 2017) and the European Health Survey (2014 and 2020). The outcome in the first column equals one if the individual never goes to the doctor, two for more than a year ago, three for more than a month and less than one year ago, and four for less than a month ago. The second column refers to a dummy equal to one if the individual did not go to the doctor in the last year. The outcomes in columns 3 and 4 are the number of visits in the last year to the general practitioner and the specialist, respectively. Regressions include dummies for gender, age, marital status, region of residence, and year. They also include years since migration and country fixed effects. *** p<0.01, ** p<0.05, * p<0.1.

bility, I re-estimate Equation **??** using immigrants' characteristics as outcomes. Results in Table 8 show that non of the coefficients of citizenship is significant, indicating that the selection of immigrants is not behind our results.

Table 8: The Impact of Naturalization on Immigrants' Characteristics

	male	age	married	north	center	south
	(1)	(2)	(3)	(4)	(5)	(6)
citizenship	-.050	-2.438	-.205	0.006	-.048	0.042
	(0.251)	(8.667)	(0.246)	(0.033)	(0.04)	(0.027)
Obs.	2543	2543	2543	2628	2628	2628
R^2	0.041	0.087	0.162	0.032	0.034	0.038

Notes: Data is from the Spanish National Health Survey (2011 and 2017) and the European Health Survey (2014 and 2020). North includes the Basque Country, La Rioja, Navarra, Cantabria, Asturias, Galicia, Castile and León, Aragón, and Catalonia. The Center comprises the Balearic Islands, the Canary Islands, Castilla-La Mancha, the Valencian Community, and the Community of Madrid. South includes Andalusia, Extremadura, Region of Murcia, Ceuta, and Melilla. Regressions include dummies for gender, age, marital status, region of residence, and year. They also include years since migration and country fixed effects. *** p<0.01, ** p<0.05, * p<0.1.

5 Discussion

Governments establish the criteria under which immigrants gain access to the host country's citizenship. They also design the public health system, including the immigrants' accessibility criteria and its annual budget (Jiménez-Rubio and Vall Castello [2020]). To

do this correctly, policymakers must understand how these citizenship and health system policies interact. This paper shows that immigrant health heavily decreases with years since arrival and that citizenship accelerates the reduction in immigrants' health. The effect is driven by an increase in the incidence of varicose veins, cervical problems, lower back pain, constipation, depression, and anxiety. Potential mechanisms are changes in dietary habits (a reduction in the consumption of fruits and cereals together with an increase in sausages) and an increase in employment. Our results also suggest that the frequency of visits to the doctor and the number of visits to the GP may decrease due to naturalization, but the coefficients are not precise.

Naturalization improves immigrants' labor force outcomes, human capital, and welfare. However, it also implies worse health outcomes; hence, authorities need to adapt the health system to compensate for those adverse effects.

My paper also sheds light on the "blackbox" of immigrants' health convergence to natives'. My results indicate that institutional factors may be behind the reduction in immigrants' health levels over years since migration that eliminates the positive initial immigrant-native health gap.

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